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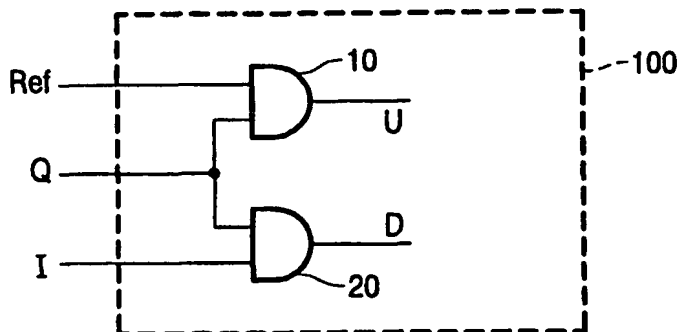
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(54) Title: PHASE LOCKED LOOP



(57) Abstract: A phase locked loop comprising a phase detector (100) for determining a phase difference between a reference signal (Ref) and mutually phase shifted signals (I, Q) to generate frequency control signals (U, D), the phase detector (100) comprising: means (10) for obtaining a first one of said frequency control signals (U, D) by binary multiplication of the reference signal (Ref) and one of the relative phase shifted signals (I, Q); and means (20) for obtaining a second one of said frequency control signals (U, D) by binary multiplication of the relative phase shifted signals (I, Q).

# INTERNATIONAL SEARCH REPORT

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**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 H03L7/089 H03L7/087 H03D13/00

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 H03L H03D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)  
EPO-Internal, INSPEC, PAJ, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 253 316 A (LSI LOGIC EUROP) 2 September 1992 (1992-09-02)	1-3
Y	page 3, line 21 -page 4, line 19; claim 5; figure 4	1-7
Y	AFONSO J A ET AL: "A PHASE-LOCKED LOOP WITH DIGITAL FREQUENCY COMPARATOR FOR TIMING SIGNAL RECOVERY", NATIONAL TELECOMMUNICATIONS CONFERENCE. WASHINGTON, DC NOVEMBER 27 - 29 1979, NEW YORK, I.E.E.E, US, VOL. VOL. 1 CONF. 1979, PAGE(S) 14401-14405 XP000809003 page 14.4.2, left-hand column, line 35 -page 14.4.4, right-hand column, line 1; figures 1-3,5	1-7

☒ Further documents are listed in the continuation of box C.

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>GB 1 496 397 A (SIEMENS AG)  30 December 1977 (1977-12-30)  page 2, left-hand column, line 43 -page 3,  left-hand column, line 51; figures 1,4</p>	1,2,4

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			BE 829056 A1	14-11-1975
			CH 580817 A5	15-10-1976
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